REMARKS

In the Office Action mailed August 23, 2006, claims 1-20 were rejected. Claims 1-3, 6-16, 19 and 20 were rejected under 35 U.S.C. §102(e) as being anticipated by Nagahiro et al. (U.S. Pat. App. Pub. No. 2003/0218833). Claims 4 and 5 were rejected under 35 U.S.C. §103(a) as being obvious over Nagahiro et al. in view of Yim et al. (U.S. Pat. No. 6,950,282). Claims 17 and 18 were rejected under 35 U.S.C. §103(a) as being obvious over Nagahiro et al. in view of Shum (U.S. Pat. No. 7,023,667).

The Office Action further included an indication that the Information Disclosure Statement (IDS) submitted with the original application on January 15, 2004 had been considered. However, no indication was given regarding consideration of the Supplemental IDS filed on August 26, 2004 (citing Tsuda, U.S. Pat. No. 6,661,615). Notification that the Supplemental IDS has been considered is requested.

Claim Rejections - 35 U.S.C. §102(e)

Claims 1-3, 6-16, 19 and 20 were rejected under 35 U.S.C. §102(e) as being anticipated by Nagahiro et al. (U.S. Pat. App. Pub. No. 2003/0218833).

Amended independent claim 1 relates to an endcap for use on an actuator arm carrying a single head gimbal assembly, and requires a body and a shielding feature extending from the body in a cantilevered configuration for reducing windage excitation of the head gimbal assembly.

Amended independent claim 11 requires an actuator arm, a head gimbal assembly connected to the actuator arm, and a shield having a first portion attached to the actuator arm and a second cantilevered portion for reducing airflow excitation of the head gimbal assembly.

Nagahiro et al. discloses a carriage arm assembly (or actuator arm assembly) for a magnetic disk drive. Nagahiro et al. discloses a suspension (2) that supports a slider (3) and a magnetic head (not shown) at a "tip" or distal end of a carriage arm (7), and a restraint board (12) affixed to the carriage arm (7). (Nagahiro et al., ¶¶16, 35 and 36; FIGS. 1-3). The restraint board (12) is T-shaped

in the embodiment shown in FIGS 1-3 of Nagahiro et al. (Nagahiro et al., ¶36; FIGS. 1-3). Opposing arms of the restraint board (12) are affixed to arm center portions (10a and 10B) with viscoelastic materials (11) and a "residual end" of the restraint board (12) is affixed to an arm root portion (13) parallel to a disk (6). (Nagahiro et al., ¶¶16 and 36; FIGS. 1-3). In other words, the restraint board (12) is resiliently secured at a middle portion of the arm (7) such that the restraint board (12) has no free or cantilevered protrusions and is spaced from the suspension (2). A vibration damping effect is thereby produced as the viscoelastic material (11) converts shearing strain energy to heat, which is then dissipated. (Nagahiro et al., ¶37). This damping effect is dependent upon the restraint board (12) being completely fixed to the arm (7) in order to produce strain in the viscoelastic material (11). Nagahiro et al does not specifically disclose the position of the suspension (2) relative to the top and bottom faces of the arm (7), though in FIG. 2 the suspension (2) appears to extend from a middle portion of the arm (7) in between the top and bottom faces of the arm (7).

In further embodiments, Nagahiro discloses affixing a restraint-board-like damper body (15) of a different shape inside a hole (17) in each arm (7) of an assembly formed by a number of carriage arms (7). (Nagahiro et al., ¶¶40 and 47; FIGS. 3-6). None of the embodiments of Nagahiro et al. disclose reducing or preventing vibration by diverting airflow, but rather damping or dissipating vibrations that have developed in the disk drive. (See Nagahiro et al., ¶¶7, 13 and 17). Indeed, the function of the damping mechanism of Nagahiro et al. requires bending of the actuator arm due to vibration in order to provide a damping effect. (Nagahiro et al., ¶¶7, 13 and 17).

Nagahiro et al. does not show, teach or disclose each and every limitation of amended independent claims 1 and 11 because Nagahiro et al. does not disclose a shield having a cantilevered portion (claim 11) or an endcap having a shielding feature supported in a cantilevered configuration (claim 1). Nagahiro et al. does not disclose the use of an endcap at all. (Cf. p. 2, line 21 to p. 3, line 9). Rather, Nagahiro et al. discloses a restraint board that is affixed to a middle portion of an actuator (or carriage) arm in order to provide a damping effect. The damping effect provided by the restraint board of Nagahiro et

al. utilizes a viscoelastic material to dissipate vibration energy as heat. That viscoelastic material only functions when the restraint board is affixed to an actuator arm in a secure, flat configuration, and would not function properly if any end portion or protrusion of the restraint board had an unaffixed, cantilevered configuration. Moreover, the restraint board of Nagahiro et al. provides a damping function and is not configured in a way that provides a shielding function as required by amended independent claim 1 and 11.

Thus, Nagahiro et al. fails to show, teach or disclose each and every limitation of amended independent claims 1 and 11, and the rejections of those claims under §102(e) should accordingly be withdrawn. Notification to that effect is requested. Claims 2-3 and 6-10 depend from amended independent claim 1 and include all of the limitations of that base claim, and claims 12-16 depend from amended independent claim 11 and include all of the limitations of that base claim. Therefore, for the reasons stated above, dependent claims 2-3, 6-10 and 12-16 are likewise allowable over the cited art.

Moreover, dependent claims 2-3, 6-10 and 12-16 contain limitations not shown, taught or disclosed by Nagahiro et al. For example, dependent claims 6-8 all require that a shielding feature of the endcap divert airflow at some portion of the head gimbal assembly. However, the restraint board of Nagahiro et al. is not configured to divert airflow, and also is spaced at a substantial distance from the head gimbal assembly (including the suspension). Accordingly, the restraint board of Nagahiro et al. is positioned in a middle portion of the actuator (or carriage) arm, and is not positioned to divert airflow away from a windward side of the head gimbal assembly as required by amended dependent claim 7. (Nagahiro et al., ¶¶36 and 40; FIGS. 1-6). Likewise, the flexible interconnect circuit (unnumbered) of Nagahiro et al. shown on page 3 of the Office Action is spaced from the restraint board and does not divert airflow relative to it as required by dependent claim 8.[1]

Dependent claim 12 requires that a baseplate of the head gimbal assembly function as a shield, and that the baseplate be attached to a first end of a load beam of the head gimbal assembly.

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[1]It should be noted that the body (14) of Nagahiro et al. is a portion of the carriage arm assembly (1) where the individual arms (7) meet, rather than a portion of an endcap, baseplate, shield or restraint board. (Nagahiro et al., ¶¶37 and 45; FIGS. 2, 4, and 5).

Nagahiro et al. discloses a suspension (or load beam) that is connected to an actuator (or carriage) arm but spaced a substantial distance from the restraint board. For the reasons discussed above, Nagahiro et al. fails to show, teach or disclose a baseplate attached to a load beam to function as a shield as required by dependent claim 12, but instead discloses a restraint board attached to a middle portion of an actuator arm. Because an "actuator arm" is a required element that is separate and distinct from the "load beam" element in dependent claim 12, the suspension of Nagahiro et al. cannot satisfy both elements where only an attachment to the actuator (or carriage) arm is disclosed.

It should further be noted that dependent claims 9 and 10 have been amended to clarify the claim language and to specify that although three-dimensional components are involved, it is the shapes defined with respect to particular reference planes that are addressed in those claims. Moreover, the orientations of the recited planes have been clarified.

Thus, the rejections of dependent claims 2-3, 6-10 and 12-16 under §102(e) should be withdrawn. Notification to that effect is requested.

Amended independent claim 19 relates to a shielded head actuation system and requires a rotatable actuator arm, a head gimbal assembly attached to a first side of the actuator arm, a rotatable magnetic disc, and an endcap that includes a body and a symmetrically balanced shape feature. Amended independent claim 19 requires that the body be attached to a second side of the actuator arm opposite the head gimbal assembly such that the shape feature is positioned adjacent to the head gimbal assembly to reduce airflow excitation of the head gimbal assembly.

Nagahiro et al. does not show, teach or disclose each and every limitation of amended independent claim 19 because Nagahiro et al. fails to show, teach or disclose an endcap with a body attached to a second side of the actuator arm such that a shape feature of the endcap is positioned opposite the head gimbal assembly to reduce airflow excitation of the head gimbal assembly. Rather, Nagahiro et al. discloses a vibration damping system that utilizes a restraint board positioned at a middle portion of an actuator arm, spaced at a distance from a suspension of a head gimbal assembly. Such a configuration as

in Nagahiro et al. is distinguishable from that required by amended independent claim 19, which requires that an endcap shape feature must be positioned adjacent to the head gimbal assembly to reduce airflow excitation. Locating the restraint board of Nagahiro et al. at the middle portion of the actuator arm such that a portion of the actuator arm is disposed in between the restraint board and the head gimbal assembly (including the suspension and gimbal) fails to satisfy the requirement of amended independent claim 19 of positioning of those components adjacent to each other. Moreover, according to amended independent claim 19, an endcap body must be positioned opposite the head gimbal assembly with respect to first and second sides of the actuator arm. However, as noted above, Nagahiro et al. does not specifically disclose that the restraint board and the suspension are positioned at different sides of the arm as shown in the embodiment of FIG. 2.

Thus, Nagahiro et al. fails to show, teach or disclose each and every limitation of amended independent claim 19, and the rejection under §102(e) should be withdrawn. Claim 20 depends from amended independent claim 19 and includes all of the limitations of that base claim. Therefore, dependent claim 20 is likewise allowable over the cited art and the rejection under §102(e) should be withdrawn. Notification to that effect is requested.

Claim Rejections - 35 U.S.C. §103(a)

Claims 4 and 5 were rejected under 35 U.S.C. §103(a) as being obvious over Nagahiro et al. (U.S. Pat. App. Pub. No. 2003/0218833) in view of Yim et al. (U.S. Pat. No. 6,950,282). In order to establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. *In re Kotzab*, 217 F.3d 1365 (Fed. Cir. 2000); MPEP 2143.01 and 2143.03. If a proposed modification of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the cited references are not sufficient to render a claim *prima facie* obvious. *In re Ratti*, 270 F.2d 810 (CCPA 1959); MPEP 2143.01.

Claims 4 and 5 depend from claim 3, which in turn depends from amended independent claim 1. Amended independent claim 1 is discussed above. Amended dependent claim 4 requires that the shielding feature not be connected to the actuator arm. Amended dependent claim 4 further details a specific cantilevered configuration of the endcap. Amended dependent claim 5 requires that the endcap be shaped such that a balancing portion and a shielding portion of the shielding feature are shaped symmetrically with respect to each other.

The relevant disclosure of Nagahiro et al. is discussed above with respect to the rejections under §102(e).

Yim et al. discloses a device for reducing damage due to head slap within a hard disk drive. In the embodiment shown in FIG. 3 of Yim et al., a limiter plate (42a), a suspension (22) and a swage plate (30) are connected to a distal end of an actuator arm beam (26). (Yim et al., col. 2, ll. 51-56; col. 3, ll. 15-28; cf. p. 1, ll. 18-25 of the present application). The swage plate (30) and the limiter plate (42a) can both be referred to synonymously as baseplates used to secure the suspension (22) to the actuator arm beam (26). (Id.). A base portion of the limiter plate (42a) is sandwiched between the suspension (22) and the actuator arm beam (26), and a projecting tab (44) extends outward and an angle inclined toward the suspension (22) such that a small gap (46) is formed between the projecting tab (44) and the suspension (22). (Yim et al., col. 3, ll. 15-28; FIG. 3). In another embodiment, Yim et al. discloses a limiter plate (48b) with a tapered end section (50) and slanted bottom surface (52), and is attached to an end surface (48) of the actuator arm beam (26) with a stud connection. (Yim et al., col. 3, ll. 29-38; FIG. 4).

Nagahiro et al. in view of Yim et al. does not disclose or suggest each and every limitation of dependent claims 4 and 5. As discussed above with respect to amended independent claim 1, Nagahiro et al. does not disclose or suggest an endcap having a body and shielding feature supported by the body in a cantilevered configuration. Likewise, Yim et al. does not disclose an endcap having a body and shielding feature supported by the body in a cantilevered configuration. Yim et al. further fails to disclose the limitations of dependent claim 3, from which claims 4 and 5 also depend, requiring that the shielding

feature include (a) a balancing portion and (b) a shielding portion. While Yim et al. does disclose a limiter plate (i.e., a baseplate) having a projecting tab, Yim et al. is silent as to the configuration of those structures and the limited figures (only showing those structures from the side) do not disclose both (a) a balancing portion and (b) a shielding portion. There is no suggestion or motivation found in the prior art of record to modify Yim et al. to include both balancing and shielding portions.

Furthermore, with respect to amended dependent claim 5, Yim et al. does not disclose or suggest that a balancing portion and a shielding portion of the shielding feature are shaped symmetrically with respect to each other. Again, these limitations go beyond the limited nature of the invention contemplated by Yim et al., and there is no suggestion or motivation found in the prior art of record to modify Yim et al. do meet the limitations of amended dependent claim 5.

Thus, Nagahiro et al. in view of Yim et al. does not disclose or suggest all of the limitations of dependent claims 4 and 5, and the rejections under §103(a) should accordingly be withdrawn. Notification to that effect is requested.

Claims 17 and 18 were rejected under 35 U.S.C. §103(a) as being obvious over Nagahiro et al. in view of Shum (U.S. Pat. No. 7,023,667).

Claims 17 and 18 variously depend from amended independent claim 11, and include all of the limitations of that base claim. Dependent claim 17 requires that the shield comprise an endcap having protrusions that form substantially a "C" shape. Dependent claim 18 requires that the shield comprise an endcap having protrusions, and that each protrusion has a first portion that defines a plane and a distal portion that is non-planar with respect to the first portion.

The relevant disclosure of Nagahiro et al. is discussed above with respect to the rejections under §102(e).

Shum discloses a dual stage suspension with piezoelectric transducer (PZT) actuators arranged to improve actuation in suspensions of short length. In general, Shum discloses using PZT actuators to provide small stroke movements of in a "functional end portion" (304) or head gimbal

assembly. In one embodiment, Shum discloses a mount plate (308) that includes a square static actuator support region (330) and a pair of protruding rotational support elements (332). (Shum, col. 1, ll. 36-67; col. 6, line 55 to col. 7, line 10; col. 8, ll. 22-45; FIGS. 9 and 10). The static actuator support region (330) is swaged to an actuator arm (12) at the swage spud (310). (Shum, col. 5, ll. 54-59; col. 8, ll. 25-28; FIGS. 9 and 10). The rotational support elements (332) are securely connected by welds to hinge beams (322) of a hinge member (320) that is positioned in an overlapping relationship with the mount plate (308). (Shum, col. 6, ll. 7-23 and 65-67; col. 8, ll. 40-42; FIGS. 9 and 10). The hinge member (320) is welded to a load beam (312) of the functional end portion (304). (Shum, col. 5, line 61 to col. 6, line 23; col. 8, ll. 40-42; FIGS. 9 and 10). PZT actuators (326) are connected between each of the rotational support elements (332) and the static actuator support region (330) via actuator support tabs (334). (Shum, col. 6, ll. 24-37 and 55-65; col. 8, ll. 40-42; FIGS. 9 and 10). The PZT actuators (326) can be energized to rotatably move the rotational support elements (332) with respect to the static actuator support region (330), by deforming those rotational support elements (332). (Shum, col. 2, line 51 to col. 3, line 20; col. 6, line 65 to col. 7, line 7; col. 8, ll. 25-28; FIGS. 9 and 10). The mount plate (302), which includes the mount plate (308) and the rotational support elements (332), are configured to be flat. (Shum, col. 8, ll. 34-36).

Neither Nagahiro et al. nor Shum discloses or suggests each and every limitation of dependent claims 17 and 18. As discussed above with respect to amended independent claim 11, Nagahiro et al. does not disclose or suggest a shield having a cantilevered portion. Shum also fails to disclose or suggest a shield having a cantilevered portion. The Office Action cites the rotational support elements of the mounting plate of Shum as forming a C-shape. However, Shum does not disclose a shield having a cantilevered portion, because the mounting rotational support elements are connected to the PZT actuators in the final assembly (the figures reproduced in the Office Action shows only a portion of the final structure culled from an exploded view). Shum explicitly requires connecting the PZT actuators to the

rotational support elements, because that is how Shum achieves the objective of causing stroke movement of the functional end (i.e., the head gimbal assembly).

Furthermore, with regard to dependent claim 18,[2] neither Nagahiro et al. nor Shum discloses or suggests an endcap having protrusions having a first portion that defines a plane and a distal portion that is non-planar with respect to the first portion. In contrast, both Nagahiro et al. and Shum explicitly disclose the desirability of flat structures (e.g., rigid structures that are parallel to the disk). (Nagahiro et al., ¶¶36 and 37 and FIG. 2; Shum, col. 8, ll. 34-36 and FIG. 9). Because dependent claim 18 requires a first portion and a distal portion that are not in the same plane, that is, not in a flat configuration relative to each other, Nagahiro et al. and Shum explicitly teach away from the claimed structure. The Office Action states that the center of the "T" (presumably the restraint board of Nagahiro et al.) defines a plane "along the length of the load beam" and the "left and right extensions" of the "T" "extend in a plane along the width of the load beam." However, the entire T-shaped restraint board of Nagahiro et al., including the center and the left and right extentions, is substantially flat and planar, and is arranged to be parallel to a magnetic disk surface. (Nagahiro et al., FIG. 3). It is worthy of note here that the claim language relates to a plane "defined" by the relevant structure, not merely a plane that intersects that structure. Moreover, the restraint board of Nagahiro et al. is attached to an actuator arm rather than a load beam, because, as discussed above, those are separate and distinct claim elements.

Thus, the cited references do not render obvious dependent claims 17 and 18, and the rejections under §103(a) should be withdrawn. Notification to that effect is requested.

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[2]The Office Action cites a "figure 2" of a prior art reference in rejecting dependent claim 18. However, the specific reference (either Nagahiro et al. or Shum) is not identified, so it is unclear which reference is being relied upon as the basis for the rejection. However, Applicants believe that the citations refer to Nagahiro et al., which shows a T-shaped restraint board (12) in its FIG. 2, and therefore will respond on the basis of that assumption.

CONCLUSION

In view of the foregoing, all of the pending claims are in condition for allowance over the prior art of record. The Commissioner is authorized to charge any additional fees associated with this paper or credit any overpayment to Deposit Account No. 11-0982.

Respectfully submitted,

KINNEY & LANGE, P.A.

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By: 

Austen P. Zuege, Reg. No. 57,907
THE KINNEY & LANGE BUILDING
312 South Third Street
Minneapolis, MN 55415-1002
Telephone: (612) 339-1863
Fax: (612) 339-6580

APZ